WHAT IS CLAIMED IS:

1. A particle detection unit that detects secondary electrons along an electron flight path, comprising:

a detector for detecting the electrons; and

a suppression grid placed in the electron flight path in front of the detector, the grid being made from a conductive material such that it may receive an applied voltage and the grid operable to transmit to the detector only a fraction of the electrons received at the grid.

2. The detection unit of Claim 1, further comprising control electronics for varying the voltage applied to the suppression grid.

3. The detection unit of Claim 1, wherein the detector is a microchannel plate.

4. The detection unit of Claim 1, further comprising a calibration unit programmed to perform calibration programmed to varied to voltage applied to the suppression unit.

5. The detection unit of Claim 1, further comprising a secondary electron emission surface for scattering electrons to be received at the suppression grid.

6. The detection unit of Claim 5, wherein the secondary election emission surface is a foil.

7. A method of counting particles, comprising the steps of:

producing secondary electrons at a secondary electron emission surface;

receiving the secondary electrons at a detector;

placing a suppression grid in the electron flight path in front of the detector, the grid being made from a conductive material; and

applying a voltage to the grid such that the grid is operable to transmit to the detector only a fraction of the electrons received at the grid.

8. The method of Claim 7, further comprising the step of setting the applied voltage to receive a known percentage of the electrons.

9. The method of Claim 7, further comprising the step of periodically scanning a range of voltages applied to the suppression grid.

10. The method of Claim 9, further comprising the steps of storing data representing a count of the electrons received at the grid as a function of voltage applied to the grid and of comparing measured data to the stored data.

11. The method of Claim 9, further comprising the steps of measuring counts of the electrons received at the grid as a function of their energy, and of comparing the measured data to stored calibration data.

12. The method of Claim 9, further comprising the step of measuring counts of the electrons received at the grid as a function of their species, and of comparing the measured data to stored calibration data.

13. The method of Claim 9, wherein the steps are repeated at a second detector.

14. The method of Claim 13, further comprising the steps of using measured data from two detectors for calibration purposes.

15. A time-of-flight mass spectrometer that receives particles, comprising:

a foil for transmitting the particles and producing secondary electrons from the particles at the output side of the foil;

a start detector for counting electrons generated from the foil;

a stop detector for counting particles transmitted through the foil; and

for at least one of the detectors, a suppression grid placed in the particle flight path in front of the detector, the grid being made from a conductive material such that it may receive an applied voltage and the grid operable to transmit to the detector only a percentage of the particles received at the suppression grid.

16. The spectrometer of Claim 15, wherein the suppression grid is in front of the start detector.

17. The spectrometer of Claim 15, wherein the suppression grid is in front of the stop detector.

18. The spectrometer of Claim 15, further comprising control electronics for varying the voltage applied to the suppression grid.

19. The spectrometer of Claim 15, wherein the detector is a microchannel plate.

20. The spectrometer of Claim 15, further comprising a calibration unit programmed to perform calibration programmed to varied to voltage applied to the suppression unit.

21. The spectrometer of Claim 15, further comprising a control unit for applying voltage to the foil.